ABSTRACT OF THE DISCLOSURE

This disclosure introduces a significant extension to the method of p-cycles for network protection. The main advance is the generalization of the p-cycle concept to protect multi-span segments of contiguous working flow, not only spans that lie on the cycle or directly straddle the p-cycle. This effectively extends the p-cycle technique to include path protection, or protection of any flow segment along a path, as well as the original span protecting use of p-cycles. It also gives an inherent means of transit flow protection against node loss. We present a capacity optimization model for the new scheme and compare it to prior p-cycle designs and other types of efficient mesh-survivable networks. Results show that path-segment-protecting p-cycles ("flow p-cycles" for short) have capacity efficiency near that of a path-restorable network without stub release. An immediate practical impact of the work is to suggest the of use flow p-cycles to protect transparent optical express flows through a regional network.